



The National Weather Service

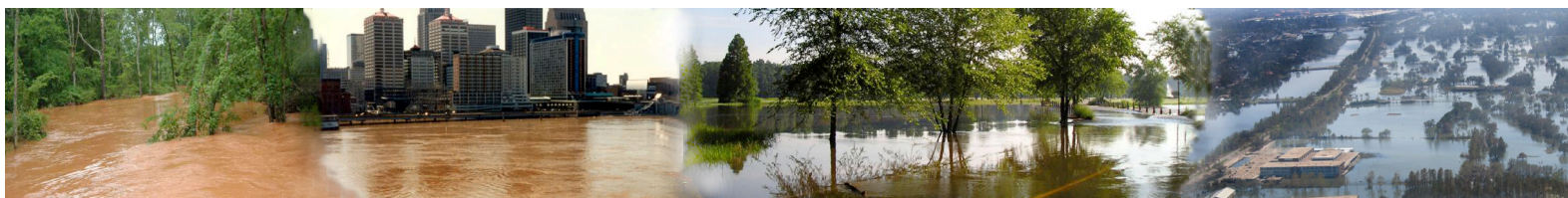
Automated Flood Warning Systems (AFWS)

Version 1.0



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Background

The concept of the Integrated Flood Observing and Warning Systems (IFLOWS) has been developed extensively since the creation of the National Flash Flood Program Development Plan in 1978. The goals of the IFLOWS Program are to substantially reduce the annual loss of life from flash floods, reduce property damage, and reduce disruption of commerce and human activities. To develop the IFLOWS concept, the National Weather Service (NWS) began a joint effort with selected states in the Appalachian Region of the United States to undertake the establishment and development of a flash flood warning system to improve flood-warning capabilities in that Region.

In 1979 the NWS first began development of a prototype IFLOWS system to use as a model for expansion into other areas. A 3-state, 12-county area along the borders of Virginia, West Virginia, and Kentucky was selected for the prototype because of its susceptibility to flooding and its lack of existing flood warning systems and available communications circuits to tie this 3-state area together. The NWS completed the prototype IFLOWS system in 1981, and work began on expanding the system in the three original states and on developing IFLOWS in Pennsylvania and Tennessee. The expansion program was targeted to implement IFLOWS equipment in approximately 120 counties of the multistate area.

In 1985, Congress approved an amendment to a continuing resolution, which earmarked additional funds specifically for expansion of IFLOWS in the areas hardest hit by the devastating floods of November 4–5, 1985. This area encompassed 29 new counties in West Virginia and numerous counties in Virginia and Pennsylvania, which were declared disaster areas. It was also expanded to include counties in North Carolina and New York with a history of serious flooding problems in the past.

While resource limitations have restricted additional expansion of direct NWS support for new IFLOWS installations, IFLOWS technology has now spread well beyond the seven original states. Numerous communities, state and federal agencies are now linked in a wide area communications network using this technology. This Automated Flood Warning Systems (AFWS) network connects numerous local flood-warning systems, and integrates and shares information from 1900 sensors in 12 states.



Web Browser Requirements

The NWS AFWS Web interface does not utilize and special scripting or protocols to display its information. Any major web browser available on multiple platforms should be sufficient to view all information within this interface.

The Interface

The NWS AFWS Interface consists of 4 main areas:

- The Blue Left-hand Navigation Area
- The AFWS Tabular Navigation Bar
- The Map and Legend Area
- The Additional Resources Area

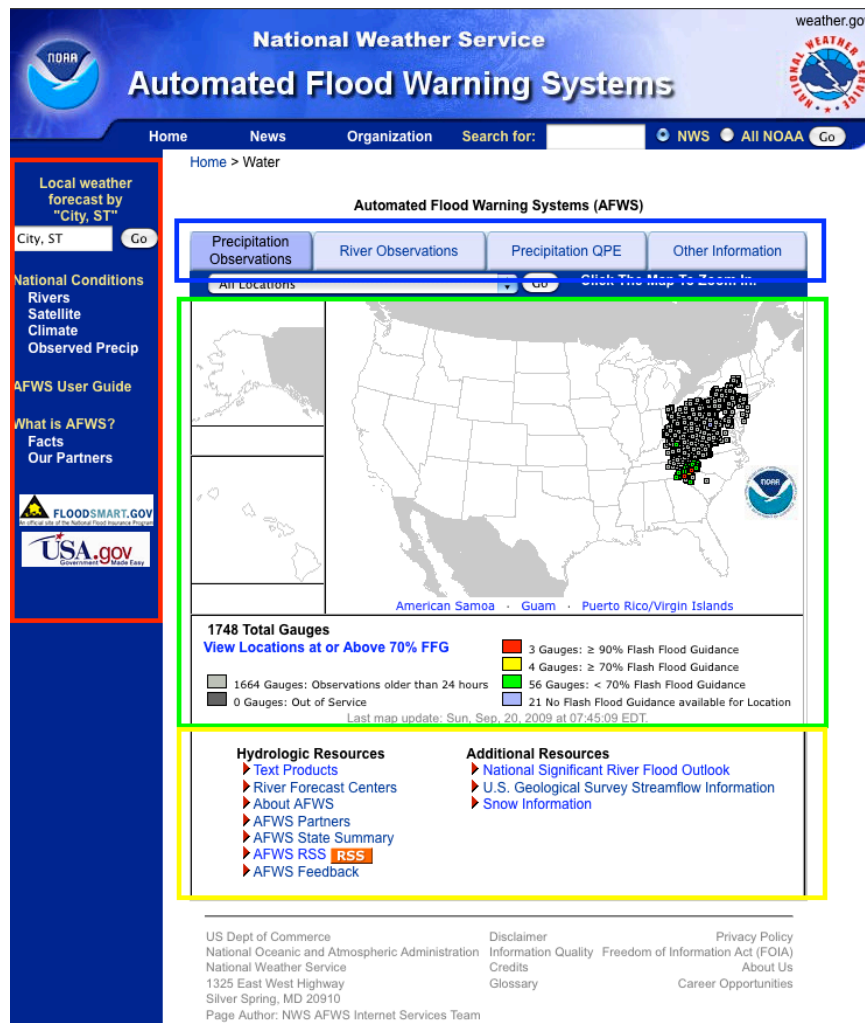
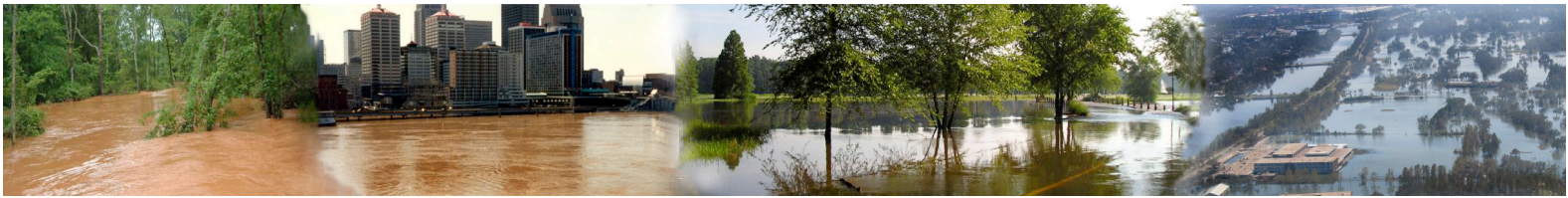


Figure 1: The Interface



Blue Left-hand Navigation Area

The Blue Left-hand Navigation Area is found throughout all NWS web pages and is utilized to present informational links to other resources and information within NWS. Here users can find historical information about the AFWS/IFLOWS program or download the AFWS User Guide PDF. Additionally, users can also select to visit websites of AFWS/IFLOWS Project Partners or choose to visit the US Government's Official Web Portal.



Figure 2: Blue Left-hand Navigation Area



AFWS Tabular Navigation Bar

The AFWS Tabular Navigation Bar is where users can select to view different types of information as it relates to the AFWS website. By default users are directed to the Precipitation Observations Tab. To view the additional areas located within the AFWS website, users need simply to click on the desired tab to navigate to that area. Available Options are:

- **Precipitation Observations (default)**
- **River Observations**
- **Precipitation QPE**
- **Other Information**



Figure 3: AFWS Tabular Navigation Bar

Each area will be covered in more detail later in the guide, in the order presented above, once the interface has been fully introduced.

The Map and Legend Area

The Map and Legend Area is designed to display information in a graphical nature to present fallen Precipitation and River Stage information to the general public in an easy to understand manner. Depending on what information are being viewed within the mapping interface, different colors are utilized to represent the different levels of fallen precipitation or level of river stage in relation to flood.

Users also have the ability click the mapping interface in selected geographical area(s) to view the information on a more localized level. Once the user clicks the desired area on the National map, they will be directed to the Weather Forecast Office (WFO) AFWS page that resides in that area of responsibility. Once on the WFO AFWS page, the user has the ability to make the data even more localized by clicking on the map in a specific county.

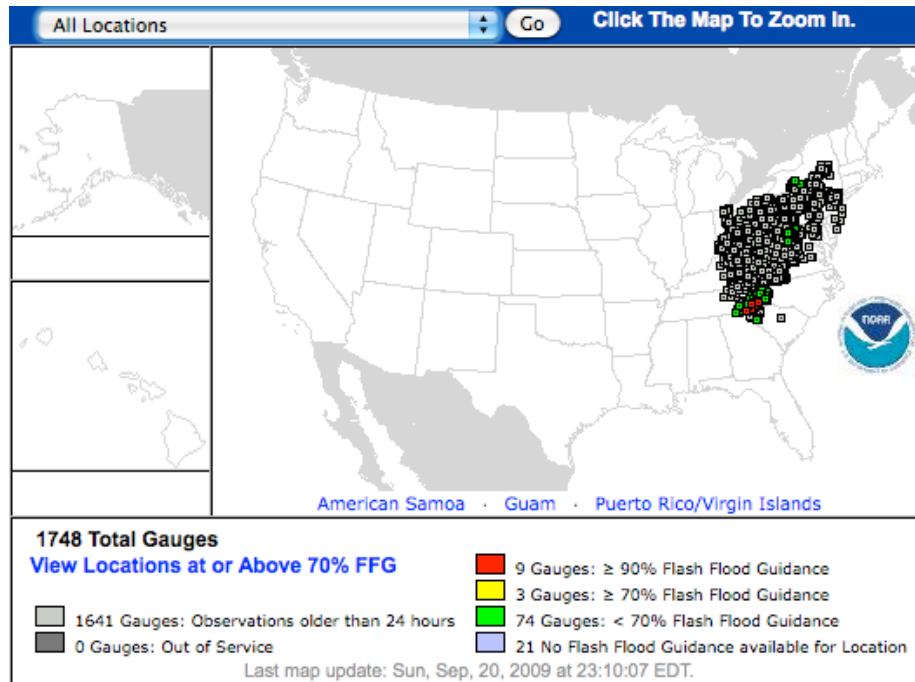


Figure 4: The National Map and Legend Area

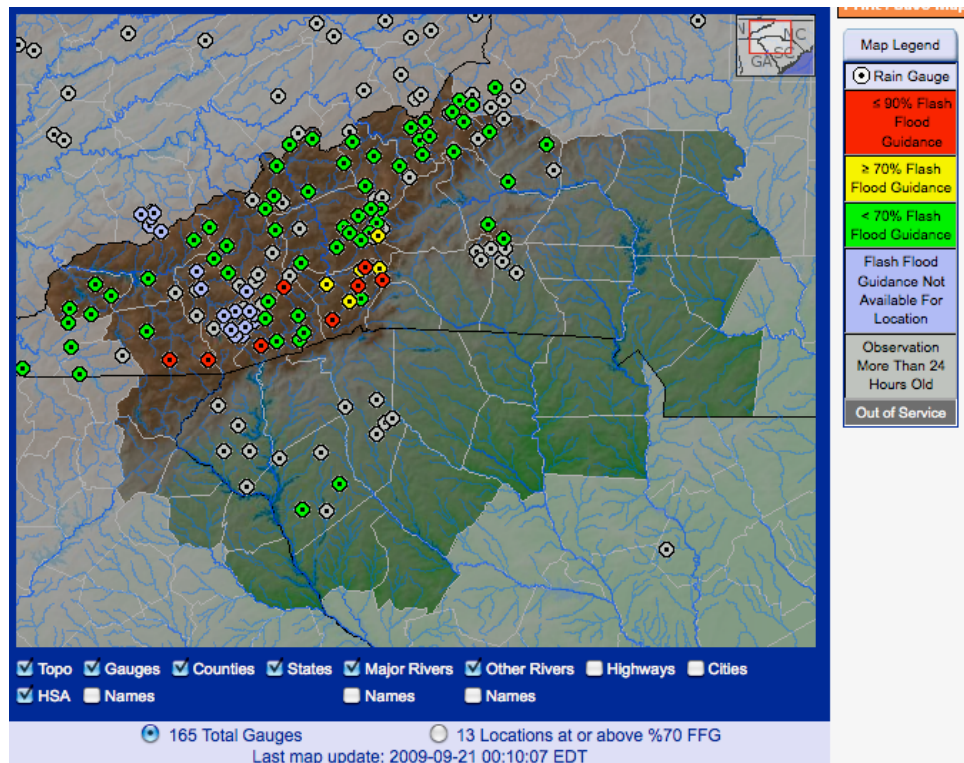


Figure 5: WFO AFWS Map and Legend



The Additional Resources Area

The Additional Resources Area is where users can acquire information that pertains to the AFWS network and NWS offices/divisions that provide relational information to the content presented within the interface. These links were designed to be a quick and easy way for the general public to obtain the most information as possible about the AFWS program, supplemental data, and its project partners.

Hydrologic Resources	Additional Resources
▶ Text Products	▶ National Significant River Flood Outlook
▶ River Forecast Centers	▶ U.S. Geological Survey Streamflow Information
▶ About AFWS	▶ Snow Information
▶ AFWS Partners	
▶ AFWS State Summary	
▶ AFWS RSS RSS	
▶ AFWS Feedback	

Figure 6: AFWS Additional Resources Area

NWS Hydrologic (Text Products)

Here users can view text products that were issued by NWS offices over the course of the last 6 days. Examples include Flash Flood Warnings, Flood Advisories, etc..

National Weather Service
Hydrologic Information Center

Local forecast by "City, St"
City, St Go

XML RSS Feeds

Warnings
Current
By State/County...
UV Alerts

Observations
Radar
Satellite
Snow Cover
Surface Weather...
Observed Precip

Forecasts
Local
Graphical
Aviation
Marine
Hurricanes
Severe Weather
Fire Weather

Text Messages
By State
By Message Type
National

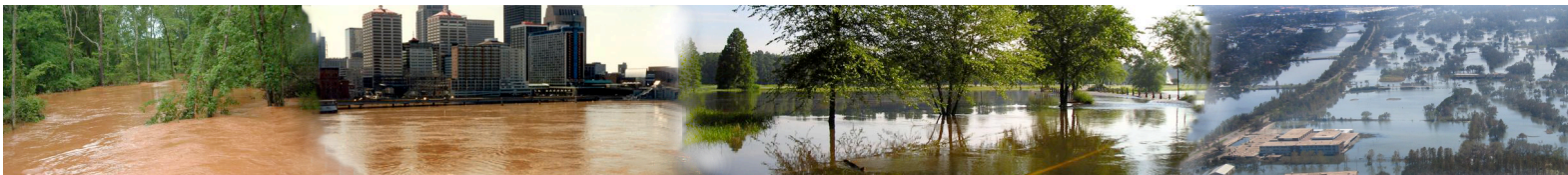
Site Map News Organization Search Enter Search Here Go

River Observations River Forecasts All Products Flood Only Drought Products Water Supply Products By WFO Flood Loss Information

Text products on this page include those issued by NWS offices over the last 6 days.

Date	Time (UTC)	Issuing Office (Areas of Responsibility)	Product (Explanation of Product Content)
09/21/2009	0421	Morristown, TN	Flood Warning
09/21/2009	0421	Paducah, KY	Flash Flood Statement
09/21/2009	0419	Louisville, KY	Flood Statement
09/21/2009	0404	Greenville-Spartanburg, SC	Flood Warning
09/21/2009	0358	Louisville, KY	Flood Statement
09/21/2009	0356	Birmingham, AL	Flash Flood Statement
09/21/2009	0354	Huntsville, AL	Flash Flood Statement
09/21/2009	0350	Birmingham, AL	Flash Flood Warning
09/21/2009	0343	Louisville, KY	Flood Statement
09/21/2009	0342	Birmingham, AL	Flash Flood Statement
09/21/2009	0340	Peachtree City/Atlanta, GA	Flash Flood Statement
09/21/2009	0337	San Juan, PR	Flood Statement
09/21/2009	0332	Louisville, KY	Flood Statement

Figure 6: NWS Hydrologic Information (HIC) Page



River Forecast Centers

This link provides users access to a map where they can select to view the River Forecast Center (RFC) page that they desire.



Mapping Area

The Mapping Area is where users can view all configured inundation and flood category data. A useful feature of the Mapping Area/Interface is a click-and-zoom tool. Users can select any location on the map, click on that area, then view the selected area more closely. This tool is available on both the Standard and Detailed Views.

An additional feature of the Mapping Area is the ability to select additional DFIRM (Digital Flood Insurance Rate Map) data layers to be displayed on the map. This is done via a group of radio selection boxes located at the bottom of the Mapping Area. The selectable data are:

- **100 Year Flood**
- **500 Year Flood**
- **Floodway Data**

An example of each layer will be shown below in the following examples.

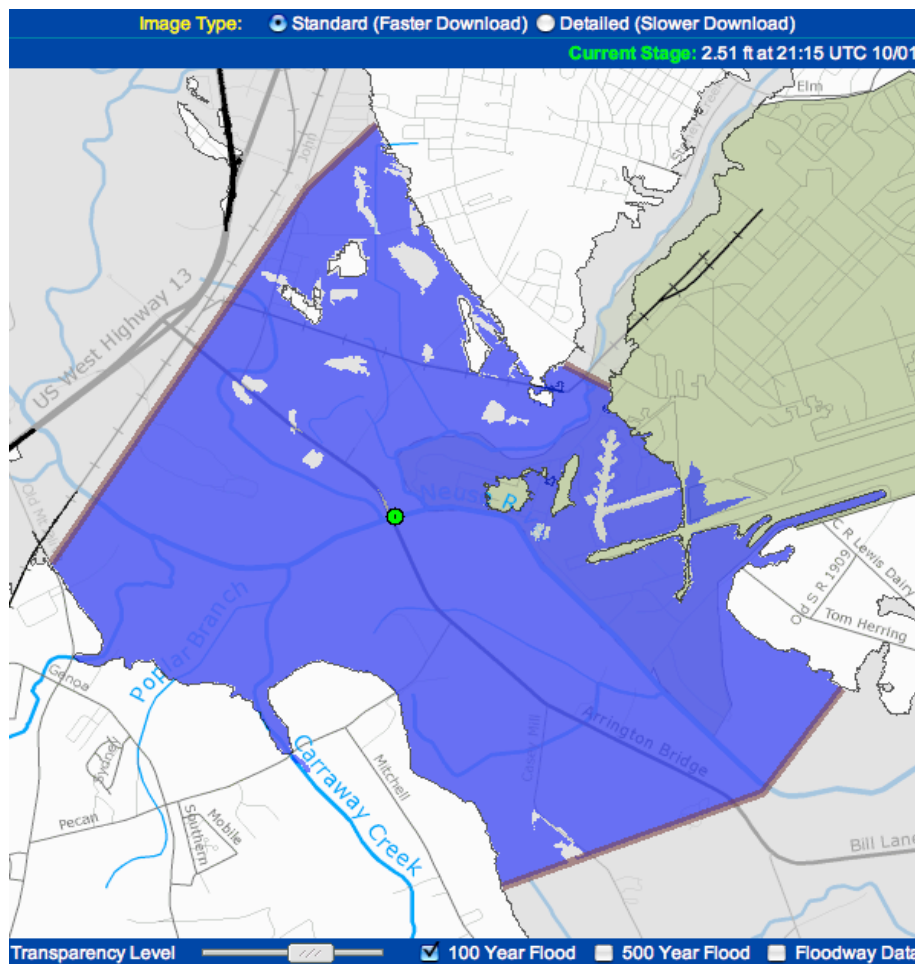


Figure 6: 100 Year Flood

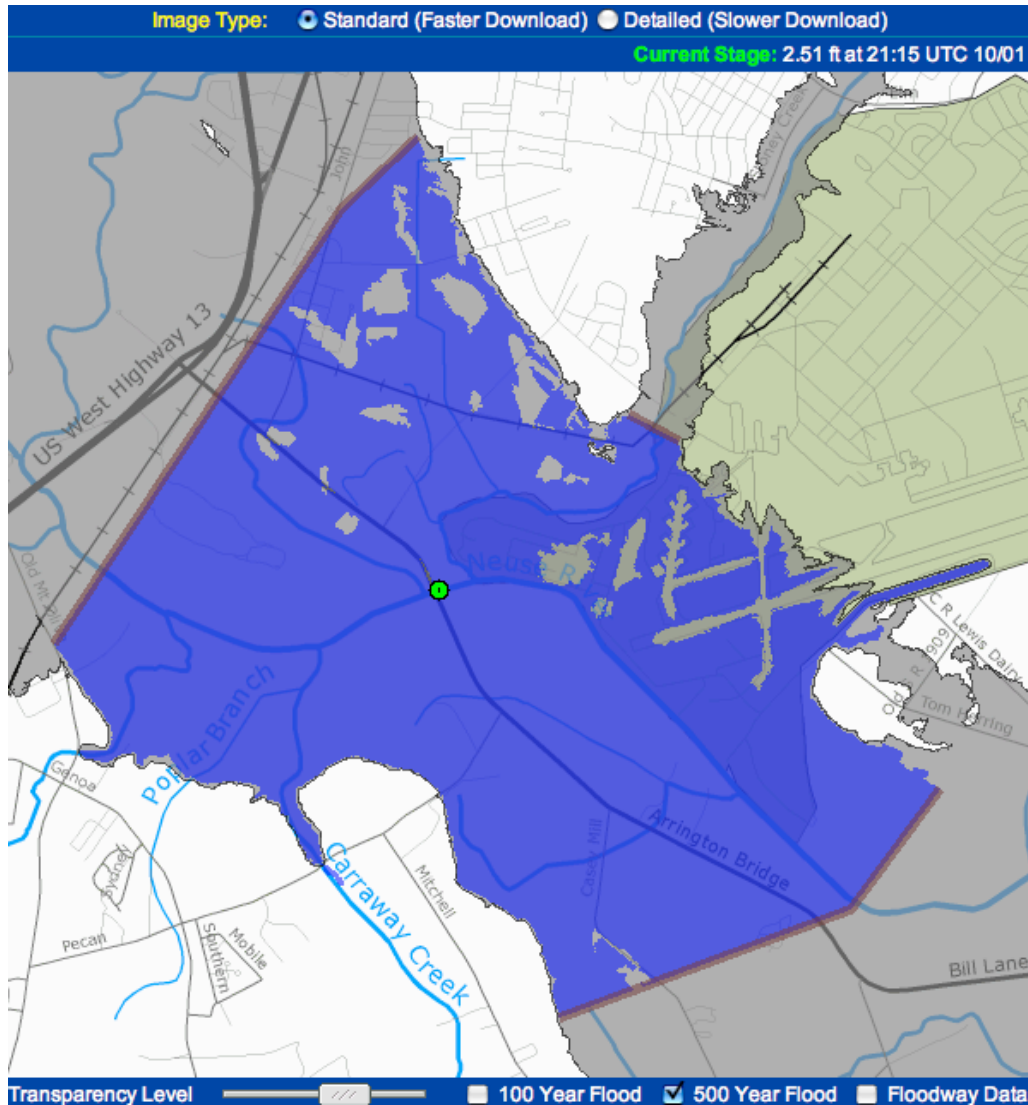


Figure 7: 500 Year Flood

100 and 500 Year Flood Data as defined by FEMA are:

The 100-Year Flood is defined as the flood elevation that has a 1-percent chance of being equaled or exceeded each year.

The 500-Year Flood is defined as the flood elevation that has a 0.2 percent chance of being equaled or exceeded each year.

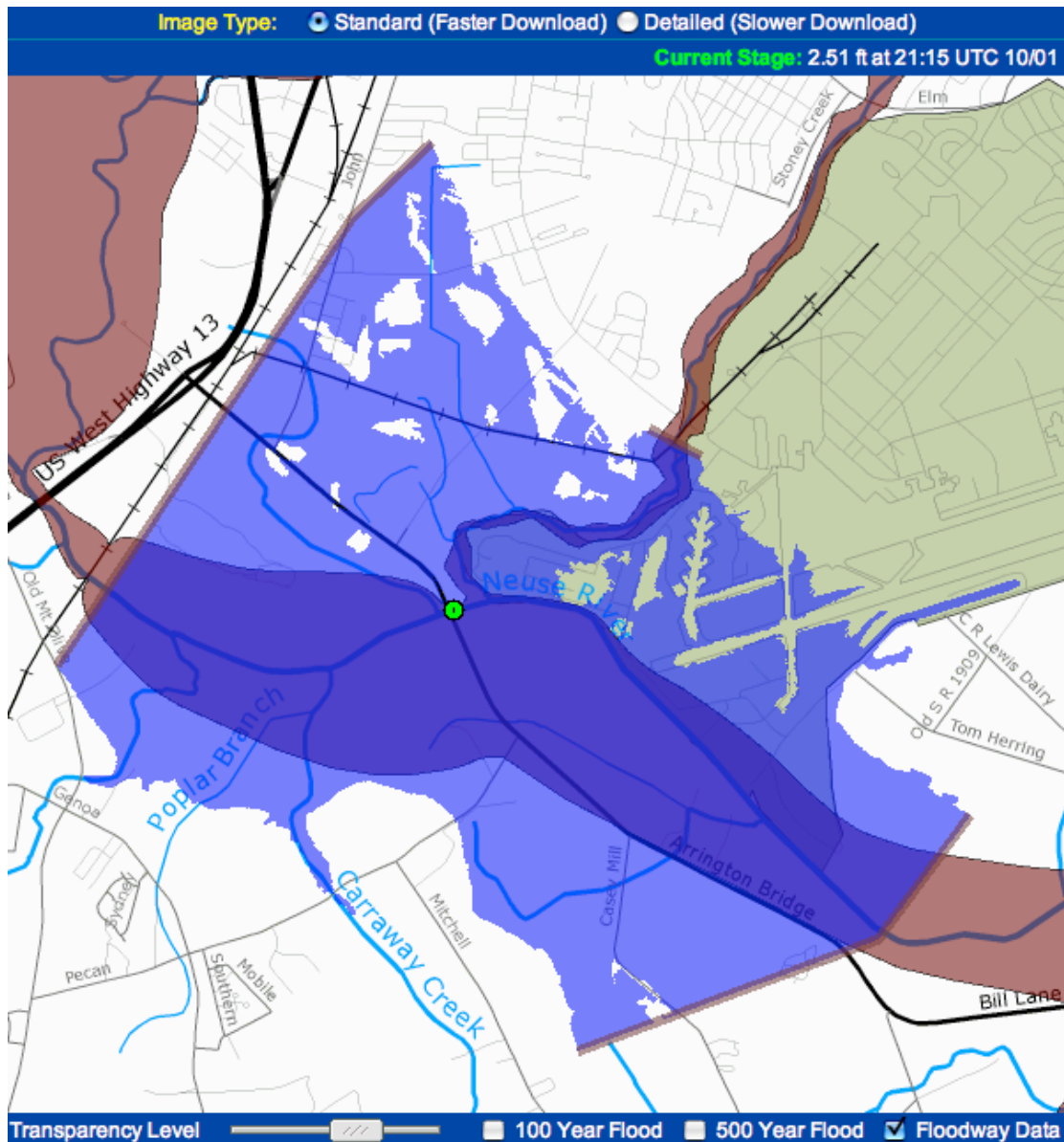


Figure 8: Floodway Data

Floodway as defined by FEMA is:

“Floodway means that portion of the floodplain which is effective in carrying flow, within which this carrying capacity must be preserved and where the flood hazard is generally highest, i.e., where water depths and velocities are the greatest. It is that area which provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot.”



The final feature to be showcased in the Mapping Area is the Transparency Control Slider. This feature allows users to move a JavaScript based slider to effectively raise or lower the default layers' opacity; default layers being the Flood Categories and Inundation Levels. This feature does not affect 100 Yr, 500 Yr, and Floodway Data.

Move the Transparency Control Slider to the left to lessen opacity and to the right to increase opacity.

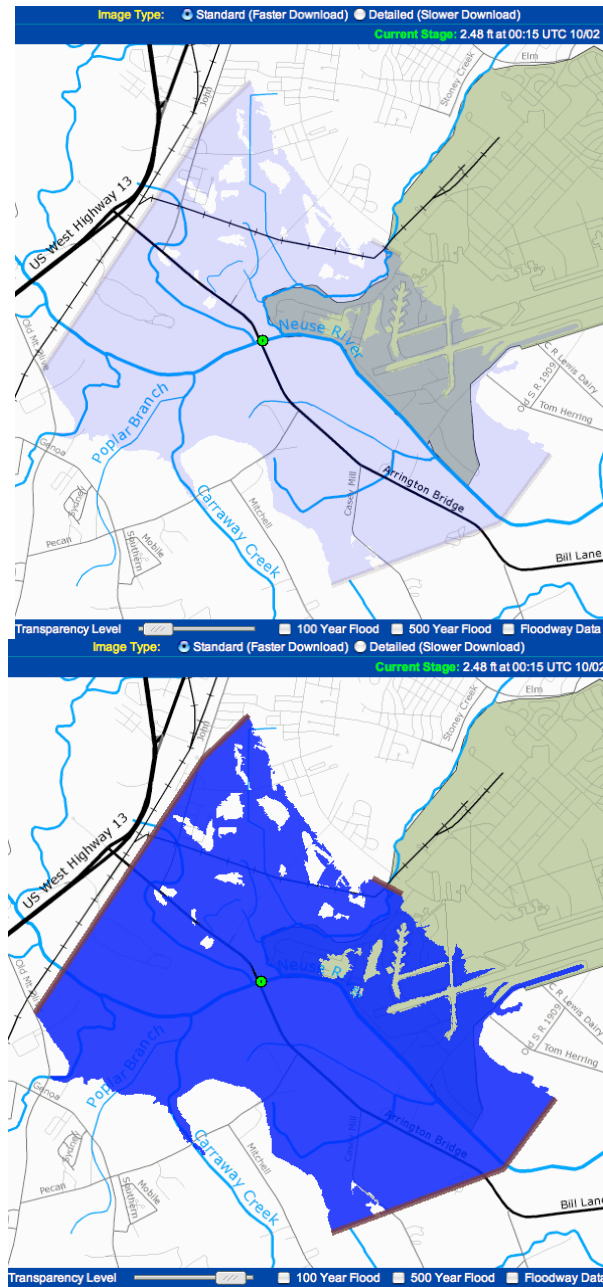


Figure 9: Transparency Control Slider



Available Data Types

Inundation Levels

By selecting the data type, entitled Inundation Levels, users will see different levels of inundation (NAVD88 or NGVD29 depending upon administrative configuration) via the point-and-click interface located in the Blue Left-hand Data Selection & Navigation Area. In the Standard View, Inundation Levels are represented via a singular colored layer. In the Detailed View, Inundation Levels are represented via multicolored layers that represent different water depths. Also the Detailed View also possesses the ability to provide users with water depth information via the mouse-over feature.

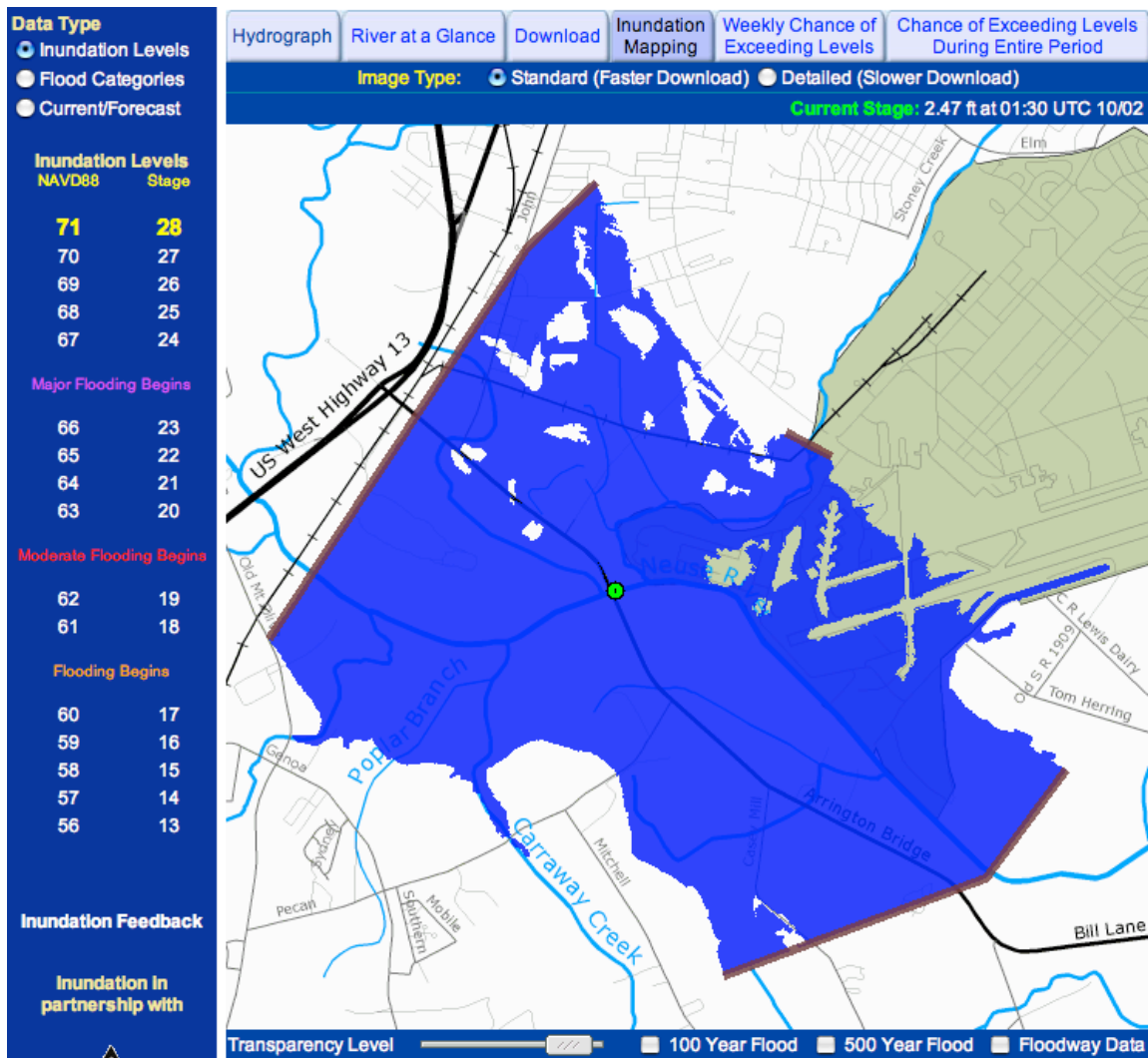


Figure 10: Inundation Levels – Standard View

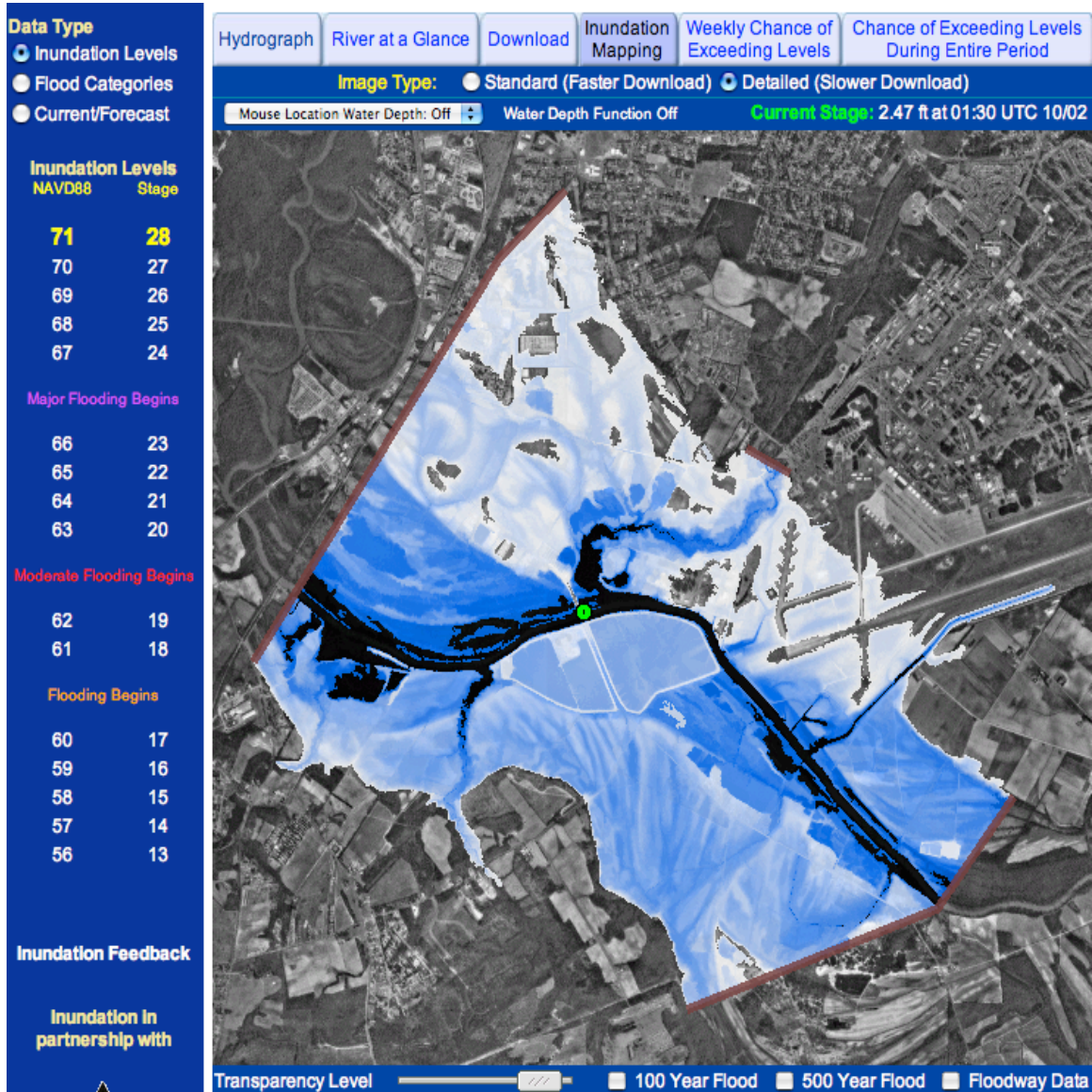
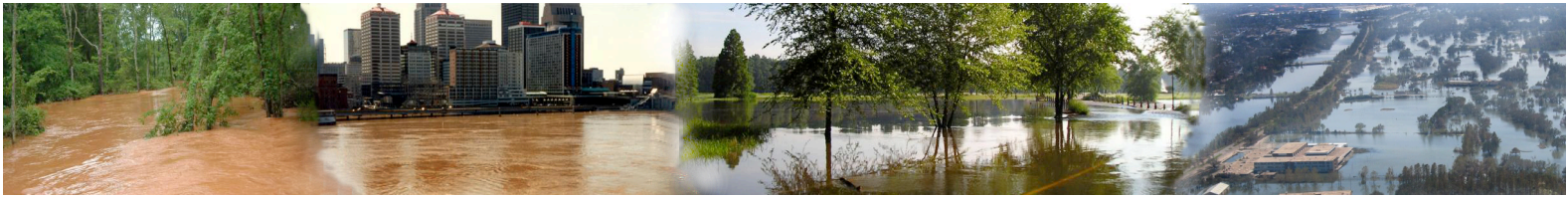


Figure 11: Inundation Levels – Detailed View



Flood Categories

By selecting the data type, entitled Flood Categories, users will see different colored categories of flooding, ranging from below flooding to major flooding. The extent of inundation depicted in aerial view will represent the maximum level of inundation for their respective categories. Flood category(s) can be displayed one at a time or overlapped for a composite image. To allow for overlaps, check the box which states "Allow Overlapping Flood Category Layers" and select the flood categories.

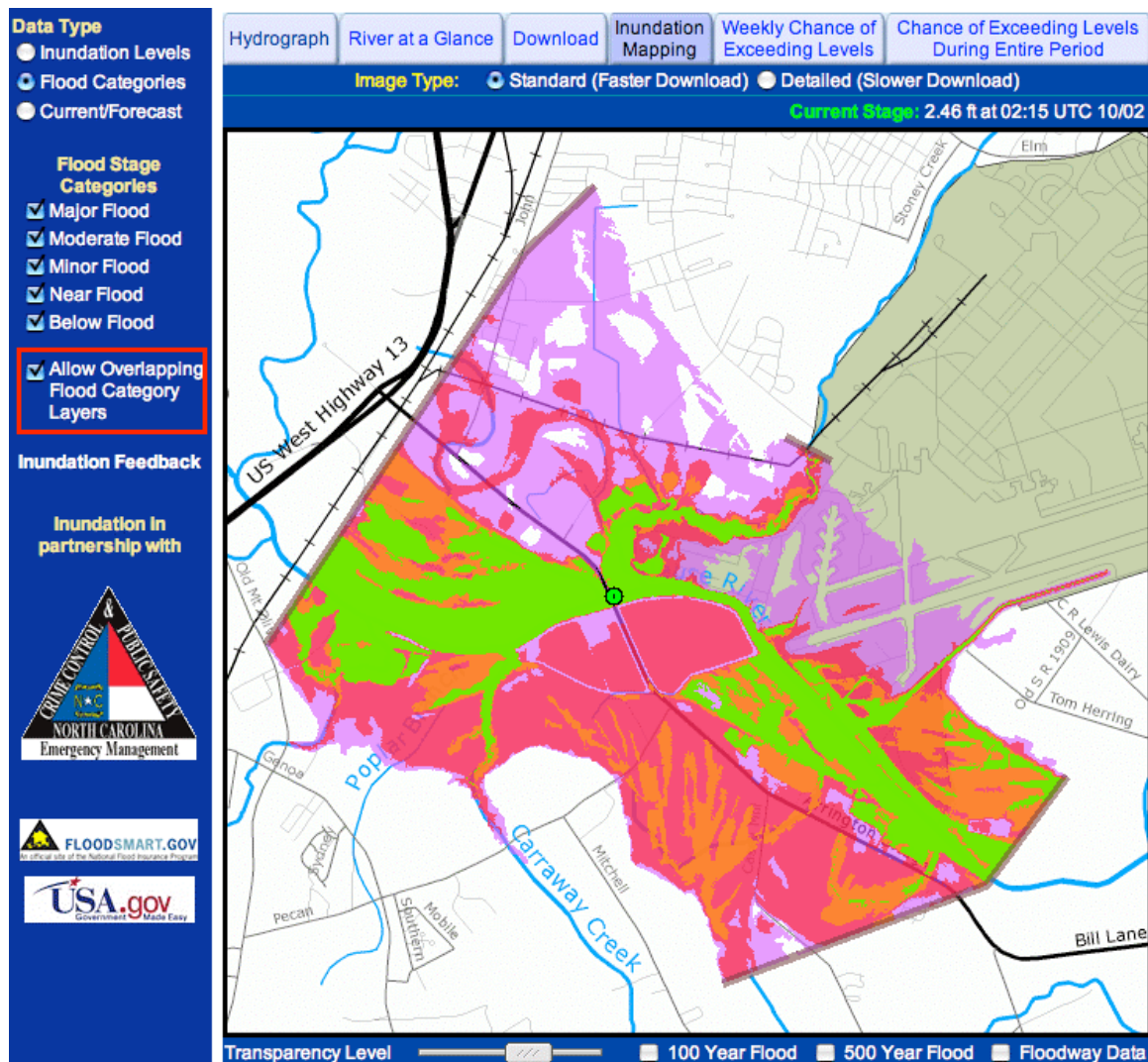


Figure 12: Flood Categories w/ All Category(s) Layers Displayed



Current / Forecast

By selecting the data type, entitled Current/Forecast, users will minimally see the current forecast, listed numerically in the left panel and also underneath the folder tabs. If the current forecast is close to flooding or the assumptions used in developing the inundation maps with hydraulic modeling and geospatial analysis are valid, inundation forecast(s) will be provided. Users can view the range of inundation forecasts for the given time via point-and-click interface located in the Blue Left-hand Data Selection & Navigation Area.

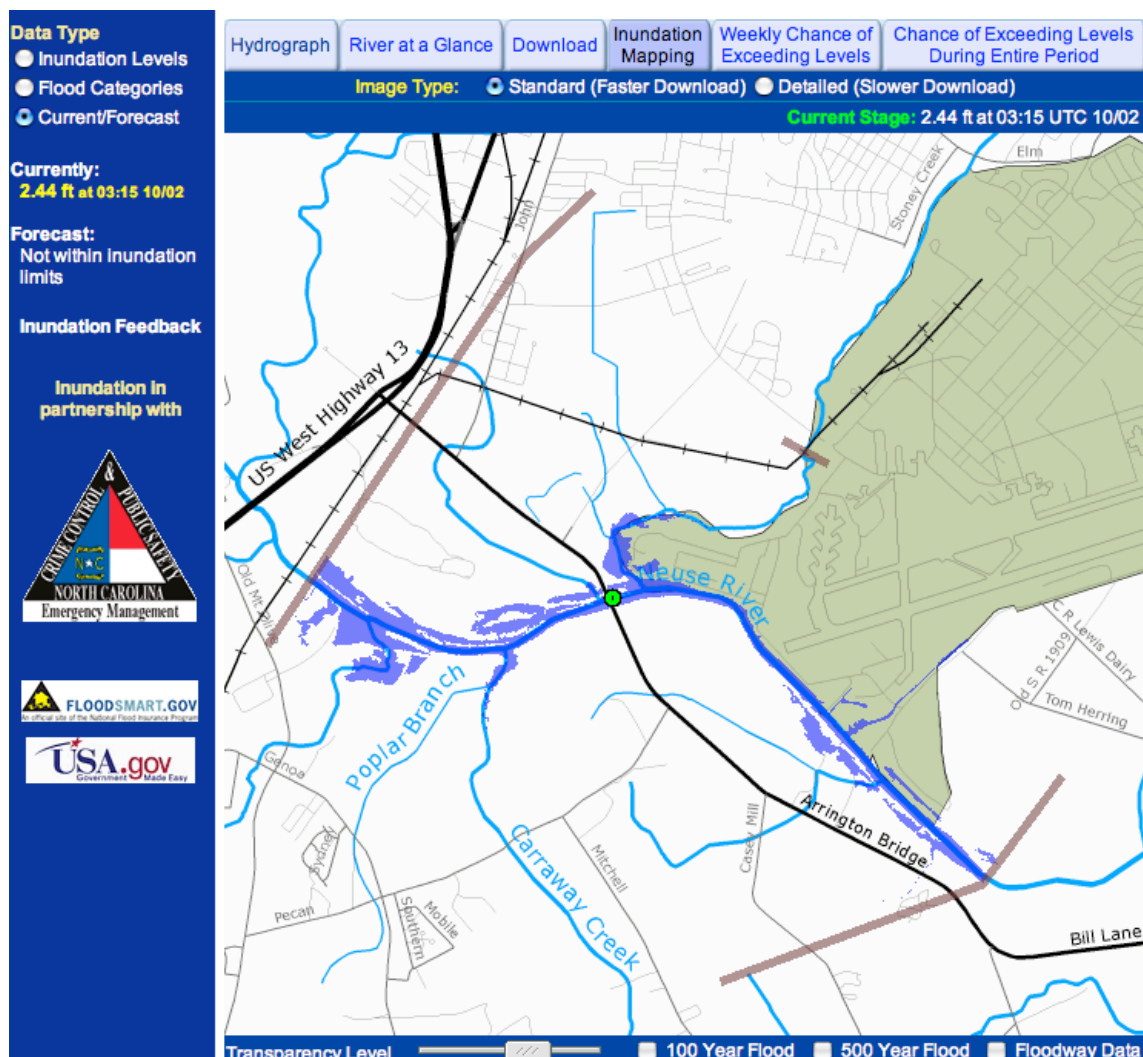


Figure 13: Current / Forecast Inundation Levels